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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

WAYMO LLC,

Plaintiff,

v.

UBER TECHNOLOGIES, INC., OTTOMOTTO LLC; OTTO TRUCKING LLC,

Defendants.

Case No. 3:17-cv-00939-WHA

DECLARATION OF MICHAEL LEBBY IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFF WAYMO LLC'S MOTION FOR PRELIMINARY INJUNCTION

Date: May 3, 2017
Time: 7:30 a.m.
Ctrm: 8, 19th Floor
Judge: The Honorable William Alsup

Trial Date: October 2, 2017

REDACTED VERSION OF DOCUMENT SUBMITTED UNDER SEAL

I, Michael Lebby, Ph.D., declare as follows:

1. I have been asked by counsel for Defendants Uber Technologies, Inc. ("Uber"), and Ottomotto LLC ("Otto") and Otto Trucking LLC (collectively, "Defendants") to provide certain opinions in the above-captioned case in connection with Waymo LLC's ("Waymo")[1] Motion for a Preliminary Injunction ("Motion") and the declaration of Mr. Gregory Kintz in Support of Waymo's Motion ("Kintz Declaration"), specifically concerning the alleged trade secrets identified in Paragraphs 36 to 55 of the Kintz Declaration. I submit this declaration in support of Defendants' Opposition to Waymo's Motion. I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

I. QUALIFICATION AND EXPERIENCE

2. I provide a brief summary of my qualifications below. A copy of my current curriculum vitae is attached as Exhibit 1 to this declaration

3. I am currently the Chief Executive Officer (CEO) and Chief Technology Officer (CTO) of Oculi LLC, which has provided international board level advisory, consulting, technological, and business-based services in the optoelectronics, semiconductor, and telecommunications industries since 2003. This is my consulting company through which I undertake my litigation expert witness work.

4. In 2015, I became a Director of Lightwave Logic to assist the company with developing polymer optical modulator products and associated packaging, manufacturing, and marketing.

5. I am on the board and CEO of OneChip Photonics Corporation, a technology company that focused on communications-based photonic integrated circuits and now is in the process of selling the remaining assets.

[1] As used in this declaration, the term "Waymo" includes Google.

6. From 2014-2016, I was a Director for Corporate and Foundation Relations with the University of Southern California. In this position, I helped the University foster relationships with semiconductor, photonics, and electronics companies in the San Francisco area.

7. From 2013-2015, I was a Professor of Optoelectronics as well as the Chair of Optoelectronics at Glyndŵr University in Wales, United Kingdom. My areas of focus included the design, simulation, and testing of photonic integrated circuits and optoelectronics integrated circuits.

8. I currently serve as a technical expert for the Photonics Unit of the European Commission, where I am currently an advisor on their funded photonics pilot lines as well as a photonics-based cardiovascular program.

9. I have served in various positions at technology companies and organizations in the optics industry, including President and CEO of the Optoelectronics Industry Development Association (OIDA), a non-profit industry trade association for optoelectronics based in Washington, D.C. In that role, I spoke on behalf of the optoelectronics industry, including testimony on Capitol Hill for the industry, and represented the U.S. optoelectronics industry in many regions of the world.

10. I am an expert in the fields of optoelectronics, electronics, semiconductors, fiber optics, and electrically and optically based designs. Optoelectronics is the study and application of devices that source, detect, control, and display light. I have design experience with optics, optical sources (such as lasers and LEDs), and receivers (such as photodetectors, solar cells, and image sensors). I also have significant experience with the testing and evaluation of semiconductors and optoelectronics, including LEDs, lasers, detectors, fiber optic communications, materials, packaging, and alignment. Notably, many of the optical and electrical designs I worked on were prototyped for manufacturing.

11. I have a Ph.D. in Compound Semiconductors / Optoelectronics from the University of Bradford, as well as a Masters of Business Administration degree and a Bachelor of Engineering degree from the University of Bradford. More recently, I was awarded a higher doctorate degree (D.Eng) for contributions to the optics and optoelectronics field through

publications and patents. I have authored or co-authored more than sixty publications on optics and optoelectronics.

12. I started my career at the Royal Electrical and Mechanical Engineer division of the Ministry of Defense in the United Kingdom, and then worked as a researcher at AT&T Bell Labs in the Photonics Research Department. From 1989 to 1998, I was an R&D Manager in optoelectronics at Motorola, where I was the most prolific inventor in Motorola's history, with over 150 issued utility patents. In total, I have well over 200 issued utility patents from the U.S. Patent and Trademark Office, and, if derivatives are considered, that total rises to over 450 patents.

13. I have been recognized professionally as a Fellow of the Institute of Electrical and Electronics Engineers ("IEEE") in 2005 and of the Optical Society ("OSA") in 2007 for my technical contributions to the field of optoelectronics. I am a Chartered Engineer (C.Eng) from IEE in the UK, which is equivalent to the PE (professional engineer) in the U.S. I have also served on the IEEE Components, Packaging and Manufacturing Technology Society ("CPMT") Board of Governors from 1998 to 2002; as the IEEE Phoenix Waves and Devices Junior Engineer of the Year in 1993; as a CPMT Distinguished lecturer in 2000; and on the CPMT technical committee (TC-10 & ECTC) from 1991 to present.

14. I am being compensated at my standard consulting rate of $465 per hour for my work in connection with this action. I am also being reimbursed for any out-of-pocket expenses. My compensation is not based in any way on the outcome of the litigation or the nature of the opinions that I express.

II. MATERIALS CONSIDERED

15. In forming my opinions and views expressed in this report, I have reviewed and considered Waymo's Motion, the Kintz Declaration, the Declaration of Pierre-Yves Droz ("Droz Declaration"), Plaintiff's List of Asserted Trade Secrets Pursuant to Cal. Code Civ. Proc. Section 2019.201 ("Waymo's TS List"), attached as Exhibit 1 to the Declaration of Jordan Jaffe in Support of Waymo's Motion ("Jaffe Declaration"), the Declaration of James Haslim ("Haslim Declaration"), the Declaration of Scott Boehmke ("Boehmke Declaration"), and the Declaration

of Paul McManamon ("McManamon Declaration"), and other materials and information that are identified in Exhibit 2 and referenced in my Declaration.

III. LEGAL STANDARDS

16. I am not an attorney and I have not been asked to provide an opinion on the law. I have been advised by Defendants' attorneys that I must apply the following legal principles regarding trade secret misappropriation to my analysis.

17. I understand that a trade secret consists of information that derives independent economic value from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use. I understand that information that can be discovered by fair and honest means, such as independent development or reverse engineering, will not receive trade secret protection. I also understand that publicly known information, such as information published in books or articles or design choices known to engineers in the field, will not receive trade secret protection.

18. I understand that for a trade secret to be protectable, the owner of the trade secret must use efforts that are reasonable under the circumstances to maintain its secrecy.

19. I understand that trade secret misappropriation means disclosure or use of a trade secret without consent by a person who used improper means to acquire knowledge of the trade secret or, at the time of disclosure or use, knew or had reason to know that his or her knowledge of the trade secret derived from or through a person who had used improper means to acquire it.

IV. SUMMARY OF OPINIONS

20. In Paragraphs 36 to 55 of his Declaration, Mr. Kintz identifies certain alleged trade secrets of Waymo and claims that Uber's Fuji LiDAR system incorporates these trade secrets.

21. Based on my analysis of the alleged trade secrets identified in Paragraphs 36 to 55 of the Kintz Declaration, I conclude that the following alleged trade secrets are not trade secrets because they are publicly known or practiced in the field of LiDAR or diode lasers: (1) [redacted] of Waymo's [redacted] system; (2) [redacted]; and (3) the use of [redacted]. I also conclude that Uber's Fuji system does not incorporate or rely upon (1) [redacted] of Waymo's

[redacted] system; (2) the [redacted]; or (3) the [redacted] of the [redacted] system.

V. WAYMO AND UBER LIDAR SYSTEMS

22. I understand from the Kintz and Droz Declarations that Waymo's [redacted] LiDAR has a single exterior aperture through which transmitted and received light will pass. (Kintz Decl. ¶¶ 135-136.) As shown in the illustration below, the [redacted] is comprised of a single optical cavity in which the transmit path ([redacted]) and receive path ([redacted]) will overlap.

[redacted]

[redacted]

23. Waymo's [redacted] LiDAR system uses a [redacted] [redacted]. (Kintz Decl. ¶ 38.) According to Mr. Kintz, [redacted]

24. As recited in the Haslim Declaration and as shown in the simplified illustration below, Uber's Fuji LiDAR comprises two separate cavities – a medium-range cavity and a long-range cavity. Each cavity has separate transmit and receive paths, with separate lenses for each path. The transmit and receive light paths do not overlap in the Fuji system, because each path is physically separated from the others by a non-reflective metal separation. The long-range cavity is positioned [redacted], while the medium-range cavity is [redacted].

[redacted]

<u>Uber's Fuji LiDAR</u>

25. In the Fuji system, the medium-range cavity and the long-range cavity each utilize [redacted]. I understand from the Haslim Declaration that the CAD drawing below illustrates a cross-sectional top view of the Fuji design. The cavities each contain a [redacted] in the medium-range cavity [redacted] in the long-range cavity [redacted]. From left to right, across both the long-range and medium-range cavities, [redacted].

[redacted]

26. I understand from the Haslim Declaration that the Fuji system was designed with two separate 32-channel cavities in part to enable two laser diodes to be fired simultaneously (one from each cavity) while minimizing interference between the laser diodes. I also understand that the distribution of the 32 laser diodes in each cavity across [redacted] was Mr. Haslim's idea, based on an iterative development process whereby he first tried to use [redacted], but found that those configurations did not provide [redacted] (Haslim Decl. ¶ 11.)

27. It was determined that distributing the 32 laser diodes on [redacted] allowed for a [redacted].

VI. WAYMO'S TRADE SECRET ALLEGATIONS

28. In his Declaration, Mr. Kintz opines that Defendants' Fuji LiDAR devices incorporate a number of Waymo trade secrets. In the paragraphs below, I respond to Mr. Kintz's

opinions with respect to certain of Waymo's alleged trade secrets specifically identified in his declaration. I reserve the right to supplement or amend this declaration if additional opinions from Mr. Kintz or other information that affects my opinions become available.

[redacted] [redacted]

29. Mr. Kintz states his opinion in paragraphs 36-43 of his Declaration that (1) [redacted] of the [redacted] design (i.e., [redacted]) is a Waymo trade secret; and (2) Uber's Fuji system incorporates the [redacted]. I disagree with Mr. Kintz on both points.

30. Waymo's claimed trade secrets Nos. 2 and 3 (which I will refer to as the [redacted]) cover a [redacted]. (Waymo's TS List Nos. 2-3.) In my view, Waymo's [redacted] is not a trade secret, but one of a few workable configurations for the [redacted] that an engineer designing a transmit block would evaluate in light of known design considerations, particularly the desire to reduce the size, cost, and complexity of the system.

31. As Mr. Kintz acknowledges, Waymo's first self-driving cars relied upon a 64-laser LiDAR system from third-party supplier Velodyne known as the HDL-64. (Kintz Decl. ¶ 22; Droz Decl. ¶ 17.) In developing its custom replacements for the Velodyne HDL-64 – the [redacted] – it is unsurprising that Waymo used a [redacted]. As explained by Mr. Droz in his deposition, [redacted]. (Droz Dep. at 28:11-30:6 (attached as Ex. 3).)

32. Once Waymo had decided to develop a [redacted], its range of choices for how many transmit PCBs to use and how to distribute the laser diodes across the PCBs was limited by well-known design considerations for automotive LiDARs.

33. As Mr. Kintz acknowledges, [redacted].

(Kintz Decl. ¶ 41.) Accordingly, 64-laser configurations with just a few large PCBs (e.g., 2 PCBs of 32 diodes each; 3 PCBs of 21 or 22 diodes each) would not be ideal for automotive LiDARs due to size considerations.

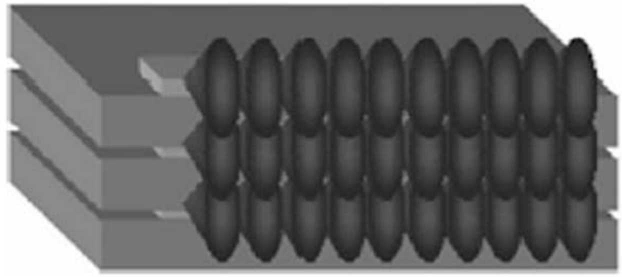
34. On the other end of the spectrum, the use of numerous smaller PCBs with fewer laser diodes on each would raise the cost of the LiDAR system, also a significant disadvantage for automotive LiDARs.

35. Additionally, as Mr. Kintz states, [redacted]. Accordingly, configurations with widely differing numbers of diodes on each PCB would be disfavored.

36. Based on these design considerations, an engineer designing a LiDAR transmit block would logically choose a configuration in a [redacted], to balance the size and cost concerns. The [redacted] is one of a few obvious configurations that strikes that balance. Use of a [redacted] does not give rise to an inference that the designer misappropriated an alleged Waymo trade secret, but may simply reflect independent development of a workable configuration from among limited choices based on well-known design considerations.

37. The number of laser diodes mounted on each transmit board – [redacted] – is not a trade secret. In addition to the considerations above that would have allowed an engineer to design a system with [redacted], a 2015 textbook on semiconductor lasers discloses a laser stack with 3 boards of 10 laser diodes each. (Xingsheng Liu et al., *Packaging of High Power Semiconductor Lasers* 111-112 (2015) ("Liu Textbook") (attached as Ex. 4).) The Liu Textbook discloses: "A semiconductor laser stack is composed of multiple semiconductor laser bars arranged vertically, as shown in Fig. 5.5." (*Id.*) Figure 5.5 of the Liu Textbook (reproduced below) shows that each of the 3 boards in the stack has 10 laser emitters.

Fig. 5.5 A semiconductor laser stack [9]



Mr. Kintz explains that Waymo's [redacted] for the transmit block of the [redacted] was also influenced by [redacted]. (Kintz Decl. ¶¶ 37-38.) As shown in Paragraph 37 of Mr. Kintz's declaration (and reproduced below), the [redacted].

[redacted]

I understand that [redacted]. (Kintz Decl. ¶ 37; Droz Decl. ¶ 21.)

38. This [redacted] is simply the well-known concept of foveated vision – a technique in light sensing systems (including the human eye) by which greater resolution is achieved in certain parts of the field of view through a denser concentration of sensors. That concept is generally known and used in the field of optical sensing systems and was used in LiDAR systems prior to

Waymo's [redacted] system. (*See e.g.*, McManamon Decl. ¶¶ 51-59; *id.* Ex. 4, Mundhenk, et al., "PanDAR: A wide-area, frame-rate, and full color LIDAR with foveated region using backfilling interpolation upsampling"; *id.* Ex. 5, Velodyne's U.S. Patent No. 8,767,190.)

39. Once Waymo chose [redacted] (Kintz Decl. ¶ 37.) The [redacted] did not work with the foveated vision model, because [redacted]. This compelled Waymo to use a [redacted]. (*Id.*) And because [redacted]. Accordingly, [redacted] was driven by the desire to implement the well-known principle of foveated vision in the [redacted] system. (*See* McManamon Decl. ¶¶ 51-59; *id.* Ex. 5, Velodyne's U.S. Patent No. 8,767,190.)

40. With respect to Mr. Kintz's opinion that Uber's Fuji system incorporates the [redacted] arrangement, it is my view that he is mistaken. The Fuji system does not contain a [redacted]. As described above at paragraphs 24-25, the Fuji system comprises two separate LiDAR cavities, each with its own transmit and receive paths. The cavities are situated [redacted] in order to facilitate better detection [redacted]. Specifically, the [redacted]. The transmit portion of each cavity contains a [redacted] with a total of 32 diodes. The [redacted] and are situated at [redacted]. The illustration below shows the separate [redacted] in the two cavities.

[redacted]

41. Fuji's [redacted] design is fundamentally different from the [redacted] design. Fuji uses separate [redacted] of the two separate LiDAR cavities. By contrast, the [redacted] has a [redacted].

42. Fuji's [redacted] as the laser stack disclosed in the Liu Textbook. Figure 5.5 of the Liu Textbook (reproduced above) shows a laser stack with 3 boards of 10 diodes each. (Liu Textbook at 111-112, Fig. 5.5.) Fuji's [redacted] have [redacted]. The Fuji system cannot be utilizing a Waymo trade secret [redacted].

43. Additionally, the positioning of PCBs [redacted] is different in the Fuji system from that of [redacted] I understand that the [redacted] system are distributed in the following pattern: [redacted]. Waymo claims that positioning the [redacted] PCBs [redacted] is a trade secret. (Waymo's TS List No. 3.)

44. As explained above, the separate [redacted] of the Fuji system are [redacted] and do not constitute a [redacted] PCBs. However, when the Fuji's two cavities are mounted side-by-side, the distribution of diodes across both cavities' transmit PCBs is: [redacted].

45. Moreover, I understand from the Haslim Declaration that the Fuji [redacted] was independently developed by Mr. Haslim and his team without any access to or usage of allegedly misappropriated Waymo confidential documents or trade secret

information. Mr. Haslim's account of the independent development of the [redacted] design is supported by the significant differences between that design and Waymo's [redacted] design.

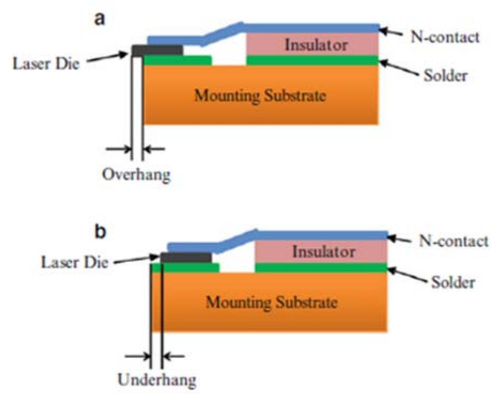
[redacted]

46. Mr. Kintz states his opinion in Paragraphs 49-50 of his Declaration that the concept of [redacted] is a Waymo trade secret. I disagree with Mr. Kintz. The [redacted] is a known design choice in the fabrication of laser diode systems, especially those systems that deal with high power laser diodes and the associated thermal heat sinking from operation. This design has been discussed in the public technical literature, examples of which I provide below.

47. As Mr. Kintz acknowledges, there are certain design considerations that drive how to [redacted]. First, as Mr. Kintz notes, [redacted]. (*See* Kintz Decl. ¶ 49.) [redacted]. This consideration weighs in favor of [redacted].

48. A second design consideration, as observed by Mr. Kintz, is to [redacted]. (*See* Kintz Decl. ¶ 50.) [redacted]. One way of avoiding this outcome is to have [redacted], thereby avoiding [redacted].

49. The Liu Textbook (cited above) illustrates [redacted] and notes the technical concerns associated with each: "Overhang and underhang characterize the alignment between the diode laser die (could be a single emitter chip or a bar) and the mounting substrate. The consequence of overhang and underhang is ineffective heat conduction and blockage of light transmission, respectively." (Liu Textbook at 224.)



While this reference describes [redacted] as an undesirable feature arising from inaccurate placement of the diodes, other references discuss [redacted] as a design choice.

50. A 2007 dissertation on laser diode systems describes a system in which [redacted]. (Christian Scholz, Thermal and Mechanical Optimisation of Diode Laser Bar Packaging 28 (2007) (attached as Ex. 5).) The author explains that the laser diode ("laser bar") is positioned [redacted]:

> Because the laser bar is an edge emitting device, the emitting area cannot be obstructed. In order to achieve this, the front edge of the laser bar hangs over the edge of the heat sink. This overhang has to be as small as possible, otherwise the thermal load is too high and the facet can be damaged. If the edge of the laser bar is positioned behind the edge of the heat sink, the laser light shines onto the heat sink. This heats the heat sink and the reflection acts as a second light source for optical elements in front of the laser bar, in turn making the diode laser ineffective.

51. [redacted]. The [redacted] was described in Mr. Scholz's dissertation years before Waymo even began developing its LiDAR systems.

[redacted] [redacted]

52. Mr. Kintz states in Paragraphs 54-55 of his Declaration that the concept of [redacted] is a Waymo trade secret. I disagree with Mr. Kintz that either of these concepts are trade secrets.

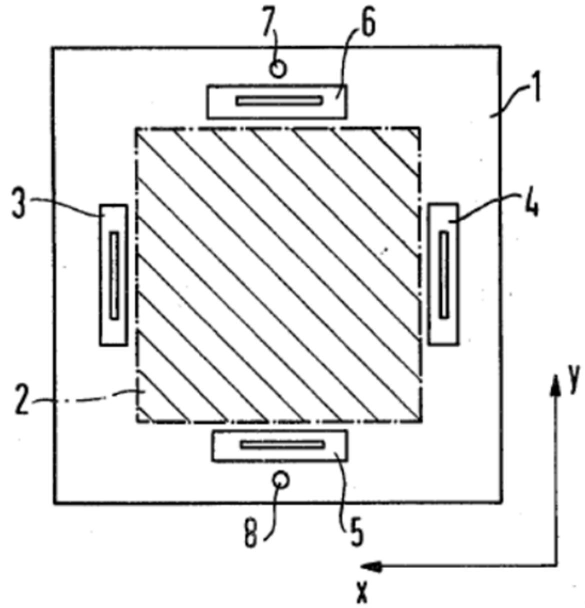
53. The concept of [redacted] has been known to the public since at least the 1970s. For example, a patent filed in 1976 describes a "means suitable for aligning and mounting a printed circuit board (PCB)" that involves mounting a "PCB [that] is provided with holes spaced apart to receive the supporting member pins" on top of a supporting member in which the "pins are spaced apart along a datum line or center line to which the PCB is to be aligned." (U.S. Patent No. 4,244,109 at 1:8-9, 1:63-67 (attached as Ex. 6).)

54. Similarly, a German patent application filed in 1980 described how "[p]rinted circuit boards that are stacked and compacted into multi-layer circuit boards require[d] to be accurately aligned," and the use of "bored holes" that "all . . . have an exact relative position to one another." (DE 3031103 patent application, Abstract (attached as Ex. 7).) Mr. Kintz is incorrect – the [redacted] has been a common practice for decades.

55. Mr. Kintz is also incorrect about whether [redacted] is a trade secret. This concept is also well-known in the field.

56. For example, U.S. Patent No. 4,432,037 (attached as Ex. 8), with a priority date of December 2, 1980, is entitled "Multi-layer printed circuit board and method for determining the actual position of internally located terminal areas." Discussing known prior art solutions "[u]p to the present time," the '037 patent describes a "fitting or alignment system" that consists of "location holes which fix a reference point and a reference line from which the position determination of the conductive patterns on the individual sheets [of printed circuit board layer] takes place." ('037 patent at 1:52-60.) In this known solution, the "conductive patterns of the individual inner layers" are "disposed on a nominally known position relative to the location system." (*Id.* at 1:60-64.) As illustrated in Figure 1, the '037 patent also applies this concept and describes how, "[i]n order to mount or set the later laminate during boring, location holes **7, 8** are provided." (*Id.* at 3:52-54.)

FIG 1



57. In other words, the use of [redacted] was well-known to the public long before Waymo's LiDAR systems existed.

58. Mr. Kintz is also mistaken in his opinion that the Fuji transmit PCBs incorporate [redacted] on the PCB. Based on my conversation with Mr. Haslim and review of his Declaration, the Fuji transmit PCB uses a [redacted]. Unlike the [redacted] the Fuji system does not use [redacted].

[redacted] [redacted]

59. Mr. Kintz states his opinion in Paragraphs 44-48 of his Declaration that Uber adapted its Fuji transmit PCB from Waymo's PCB Design Files, based on (1) the presence of [redacted] on the Fuji PCB; (2) [redacted] of the Fuji PCB; and (3) Mr. Kintz's opinion that the Fuji PCB appears to be [redacted] Waymo's PCB Design Files because of the [redacted]

60. I disagree with Mr. Kintz that any reasonable inference can be drawn that the Fuji transmit PCB was adapted from Waymo's PCB Design Files. First, as explained above, Fuji's

transmit PCBs and its [redacted] for the transmit block [redacted] were independently developed by Uber engineers who had no connection with the allegedly misappropriated Waymo confidential documents.

61. Second, it is clear that the Fuji transmit PCB uses a different design from Waymo's [redacted]. Mr. Kintz compares an image of the [redacted] to a machine drawing of what is purportedly an Otto PCB that Waymo received by email from the vendor [redacted]. (Kintz Decl. ¶¶ 32-34; Waymo's Motion for a Preliminary Injunction at 10.) Mr. Kintz concludes that Uber [redacted]" (*Id.* ¶ 46.) A more careful comparison of the [redacted] to the Fuji transmit PCB for the medium-range cavity reveals numerous differences in the component layout, shape, size, and structure of the two PCBs. Below are images of the two PCBs side-by-side, revealing numerous design differences, including: (1) [redacted] (2) [redacted] (3) [redacted] (4) [redacted] and (5) [redacted]. I note that the [redacted] on the Fuji transmit PCBs is [redacted]. (*See* Haslim Decl. ¶ 15.) The laser diodes on the transmit PCBs in the long-range cavity have a [redacted]. (*Id.*)

[redacted]

62. Additionally, the Fuji is designed for [redacted] I have spoken with Mr. Haslim at Uber and reviewed his Declaration, including the position and orientation information for each diode in Exhibit B to the Haslim Declaration. I have also reviewed Exhibits 1-2 to the Jaffe Declaration, which includes the [redacted] document attached as Exhibit 2. The Fuji's medium-range cavity has [redacted] and the long-range cavity has [redacted]. In contrast, the [redacted] design has a [redacted]. (*See* Jaffe Decl. Ex. 1 at 25.) Because the Fuji and [redacted] are designed for [redacted]. This can be shown by a comparison of the [redacted] in Exhibit B to the Haslim Declaration (Fuji) and on page 17 of Exhibit 2 to the Jaffe Declaration ([redacted]

E. Comments on Other Alleged Waymo Trade Secrets

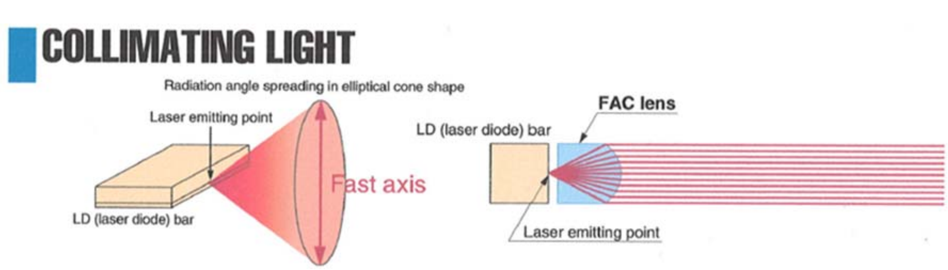
63. I have reviewed Waymo's TS List (Jaffe Decl. Ex. 1). Waymo's Motion and the Kintz Declaration purport to address only certain alleged trade secrets from Waymo's TS List,

including [redacted]. The other alleged trade secrets from the TS List are not addressed in Waymo's Motion or the Kintz Declaration. I reserve the right to submit a supplemental declaration addressing any other alleged trade secrets that Waymo raises in its further briefing or declarations.

64. I offer the following comments regarding one of the other alleged trade secrets from the TS List.

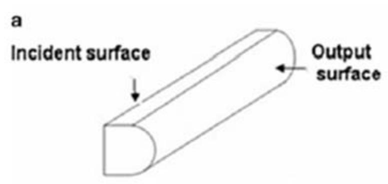
65. [redacted] claims as a trade secret a [redacted] The use of [redacted] is a well-known technique in laser systems and not a trade secret belonging to Waymo.

66. [redacted] are commonplace in the design of laser systems. [redacted] is known as a fast-axis collimating (FAC) lens, available from vendors such as Hamamatsu. (Hamamatsu product specification sheet for FAC Lens (J10919 series) (attached as Ex. 8).) As explained in the specification sheet: "The J10919 series FAC lens is an optical lens that collimates light spreading from a semiconductor laser in the fast-axis direction. Semiconductor lasers have a large divergence angle in the fast-axis direction, so the output light cannot be efficiently used unless collimated. The FAC lens collimates light spreading from a semi-conductor laser into a narrow beam . . . ." As shown in the figures of the specification sheet (reproduced below), the [redacted] FAC lens is [redacted] (i.e., [redacted]).



67. The [redacted] is disclosed in the Liu Textbook. The Liu Textbook states: "A laser stack is composed of collimated laser bars with fast axis collimators (FACs)." (Liu Textbook at 112.) As seen in Figure 5.18 of the Liu Textbook (reproduced in part below), the FAC lenses can be [redacted]:

Fig. 5.18 Three collimation lenses for the fast axis [20]. (a) "D" type. (b) "O" type. (c) Inverse "D" type



The [redacted] are mounted [redacted] in the laser stack to [redacted] the laser light. Figure 5.10 of the Liu Textbook (reproduced below) illustrates the positioning of the FAC lenses in front of the diodes:

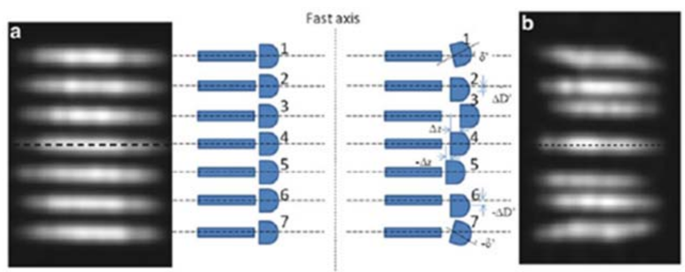


Fig. 5.10 The collimated beam error of the stack due to the installation error of FAC [12]. (a) The ideal beam with no installation error. (b) Typical installation and collimated beam errors

68. Cylindrical FAC lenses are in widespread use in various types of laser systems, for example, optical storage. Accordingly, there are a large number of suppliers that design cylindrical FAC lenses to collimate laser light and the use of such lenses is well-known in the industry.

VII. CONCLUSION

69. Based on my analysis above, I conclude that Waymo's alleged trade secrets of (1) [redacted] of Waymo's [redacted] system; (2) the [redacted]; and (3) the [redacted] are not trade secret information, because they publicly known or practiced in the field of LiDAR or diode lasers. I also conclude

that Uber's Fuji system does not incorporate or rely upon (1) [redacted] of Waymo's [redacted] system; (2) the [redacted] system; or (3) [redacted].

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Executed this 7th day of April, 2017, in Lech, Austria.

Michael Lebby, Ph.D.